# *Stationary Generators, Regulatory Requirements and Permitting*

**State of Delaware**
**DNREC - Air Quality Management**

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*Blue Skies Delaware; Clean Air for Life*

# *Outline*

- Overview of Regulation No. 1144, “Control of Stationary Generator Emissions”
- Generator Permitting Process

# *Brief History of Regulation 1144*

- **<u>Distributed Generation (DG)</u>** - typically thought of as smaller, on-site, fossil fuel-fired units, to generate site's own electricity.
- DG units typically emit higher rates of air contaminants per kilowatt-hour of power than larger units.
- Typically operate when the health threat from ozone is at its worst (hot, sunny days…which coincide with high energy demands).
- Thus, DNREC initiated development of a regulation to control the air emissions from DG units and emergency generators.

# *Applicability*

- Applies to any ***generator***, except for:
  - generators subject to best available control technology (BACT) or lowest achievable emission rate (LAER) NOx limitations under NSR;
  - ***existing***, ***emergency generators*** at fire stations;
  - residential generators used only during times of ***emergency***;
  - generators ≤ 10 kW; or
  - ***mobile*** generators


# *Definitions of Importance*

- Generator: internal combustion engine (except combustion turbine) and associated equipment that converts fuel to electricity, or electricity and thermal energy.

- Emergency:
  - a power outage (due to various unintentional reasons), or
  - a deviation of voltage or frequency from the electrical provider.

# *Definitions of Importance*

- Emergency Generator: operates only
  - during emergencies,
  - for testing purposes, or
  - for maintenance purposes.
- Distributed Generator: may operate at any time.
- New: any generator installed or repowered after January 11, 2006.
- Existing: any generator installed prior to January 11, 2006.

# *Definitions of Importance*

- Mobile:
  - a generator which is self-propelled or intended to be propelled, or
  - is portable or transportable.

- Stationary: a generator which is not “mobile”.
  - If a mobile generator stays at a location for more than 12 consecutive months, it could be considered stationary.
  - This requirement cannot be circumvented by moving a mobile generator which is acting as a stationary generator.

# *Initial Notification*

- Delaware did not have much data on the universe of generators operating in the state at the time Reg. 1144 was under development.
  - Data is needed to evaluate the effectiveness of the regulation.
  - Aid in future updates.
- To help develop a database an initial notification requirement was put in Reg. 1144:
  - generator owner's name and address;
  - generator's installed address, make, model, year, rating; and
  - classification (emergency vs. distributed).

http://www.awm.delaware.gov/Info/Regs/Pages/AQMReg1144.aspx

# *Emissions Standards*

| Generator Type | Existing | New |
|---|---|---|
| **Emergency** | No Emission Standards | EPA Nonroad Standards |
| **Distributed** | Standards Based Upon Achievable Levels | Standards Based Upon Achievable Levels |

# *Emissions Standards*

- Emergency generators:
  - Existing – no actual emissions limits; just follow manufacturers maintenance and operating requirements/instructions.
  - New – generator must meet the emissions standards set by the US EPA for Nonroad engines.

***An "old" generator being installed as a new generator must comply with the currently applicable Nonroad standards.

# *Emissions Standards*

- Existing, distributed generators must meet the following standards:

| Pollutant | Emission Standards In lbs/MWh |
|---|---|
| Nitrogen Oxides | 4.0 |
| Nonmethane Hydrocarbons | 1.9 |
| Particulate Matter (liquid-fueled reciprocating engines only) | 0.7 |
| Carbon Monoxide | 10.0 |
| Carbon Dioxide | 1,900 |

# *Emissions Standards*

- New distributed generators must meet the following standards:

| Pollutant | Emission Standards in lbs/MWh | | |
|---|---|---|---|
| | Installed On or After Jan. 11, 2006 | **Installed On or After Jan. 1, 2008** | Installed On or After Jan. 1, 2012 |
| Nitrogen Oxides | 2.2 | **1.0** | 0.6 |
| Nonmethane Hydrocarbons | 0.5 | **0.5** | 0.3 |
| Particulate Matter (liquid-fueled reciprocating engines only) | 0.7 | **0.7** | 0.07 |
| Carbon Monoxide | 10.0 | **10.0** | 2.0 |
| Carbon Dioxide | 1,900 | **1,900** | 1,650 |

# *Emissions Standards*

- For distributed generators, remember:
  - The standards for existing, distributed generators equate to an approximate 90% reduction in emissions, for a typical diesel generator.
  - The standards for new, distributed generators can be met by the latest gaseous-fueled generators and by well-controlled diesel generators.

- ***Emissions standards for distributed generators are fuel-neutral.****

*New, distributed generators using landfill or waste gases do not have multiple "tiers" of emission standards.

# *Operating Requirements*

- An emergency generator has no limits on the number of hours it can operate…but it can only operate during emergencies, testing, or maintenance.
- A distributed generator has no limit on the number of hours it can operate…and it can operate at any time.

***However…***

- No generator can be operated for testing or maintenance before 5pm (except those required to meet NFPA* or JCAHO** standards) on a day when:

| | | |
|---|---|---|
| ○ Ground Level Ozone Pollution Forecast or<br>○ Particle Pollution Forecast | = | ○ "**Code Red**" or<br>○ "**Code Orange**" |

*National Fire Protection Association ** Joint Commission on Accreditation of Healthcare Organizations

# *Other Requirements*

- Sulfur content limits for all fuels:

| | Diesel Fuel | Gaseous Fuels | Alternative Fuels |
|---|---|---|---|
| **Sulfur Content Limit** | **0.05% S (500 ppm)** | **10 grains Total S Per 100 dscf** | **10 grains Total S Per 100 dscf** |

- Records to be kept:
  - monthly and yearly fuel usage,
  - monthly and yearly operating hours (a non-resettable hour meter is required),
  - monthly and yearly testing and maintenance.

# *Other Requirements*

- For each shipment of liquid fuel received, a receipt must be obtained from the distributor which identifies:
  - the type of fuel;
  - the sulfur content of the fuel; and
  - the test method used to determine the sulfur content.

**(As an alternative, a laboratory may analyze the fuel after each shipment, in order to certify the above information.)**

# *Other Requirements*

- Records must be kept at least 5 years.
- Records can be hard copies (papers) or electronic copies (CDs, floppy disks, etc.)
- No requirement to report records…but an owner must provide the records to the Department upon request.

# *Credit for Emissions Reductions*

- A generator can receive “credit” to use toward achieving its applicable emission rates by:
  - operating on a fuel that would otherwise be flared (landfill gas, process gas);
  - operating as a “combined heat and power” system; or
  - simultaneously generating electricity from a non-emitting resource (wind, solar, etc.).




# *Air Permits for Generators*

- Permit Application Forms
- Permitting Process
- Permitting Requirements
- Full Compliance Evaluation

**Caterpillar- 470 kW emergency generator**

**Caterpillar -100 kW emergency generator**

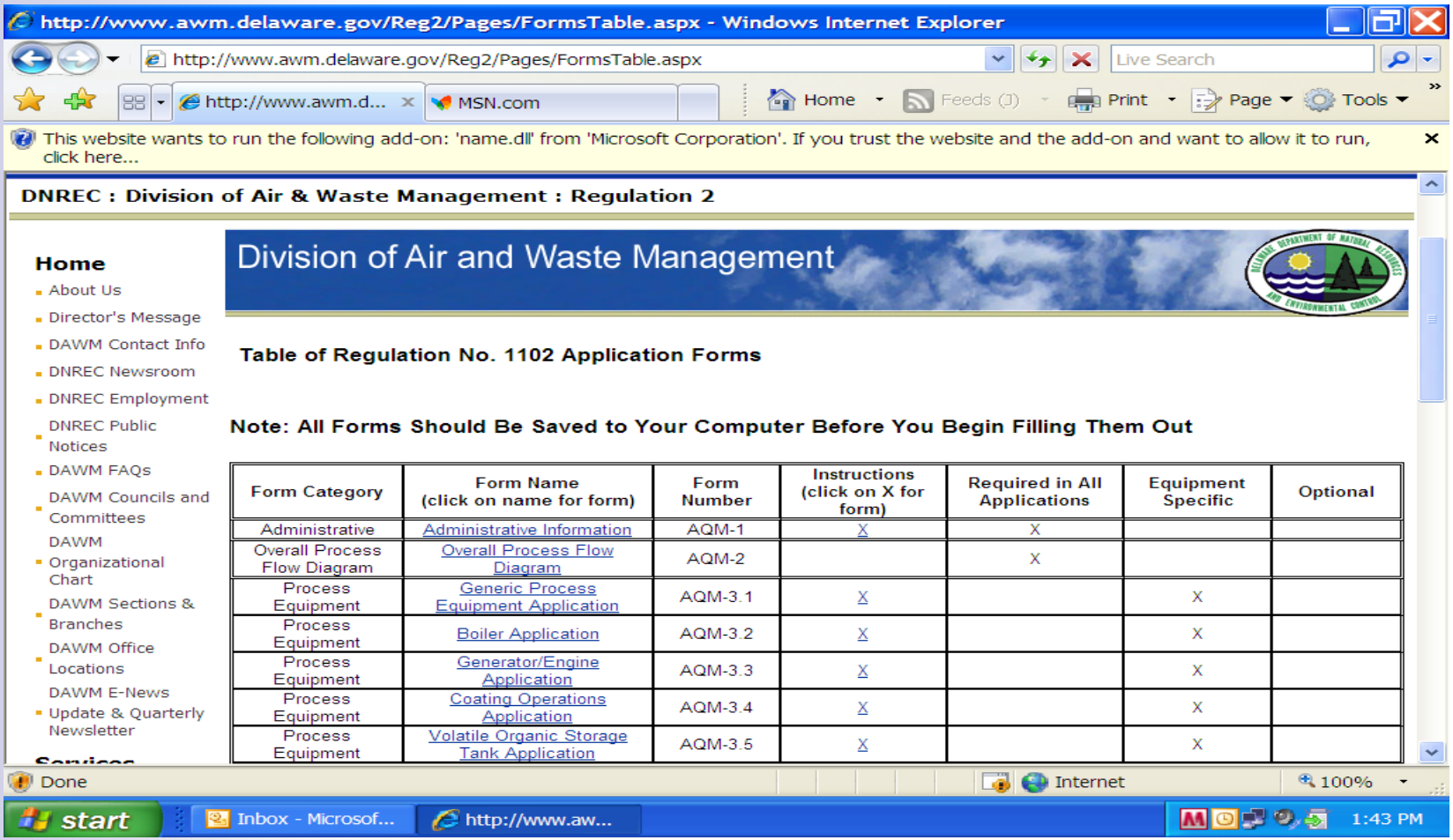
# *Permitting Threshold for Generators*

- Generators requiring permits:
  - Emergency generators rated greater than 450 kW
  - Distributed generators of any size
- Generators which do not require permits:
  - Emergency generators equal to or less than 450 kW provided that Regulation No. 1125 does not apply
  - Any generator for residential use only

# *How Do I apply for a Generator Air Permit?*

- Submit:
  - AQM-1: Administrative Information Form
  - AQM-3.3: Generator/Engine Application
  - AQM-5:  Emissions Information
  - Stationary Generator Initial Notification
  - Permit fees per generator:
    - $215 for construction permit
    - $165 for legal advertising
    - $125 annual fee *(Company is billed annually for this)*

# Download forms and applications



# Regulation No. 1102

## Application Form AQM-3.3 – Generator/Engine Application

**DNREC – Air Quality Management Section**
**Application to Construct, Operate, or Modify Stationary Sources**

Form AQM-3.3
Page 1 of 5

### Generator/Engine Application

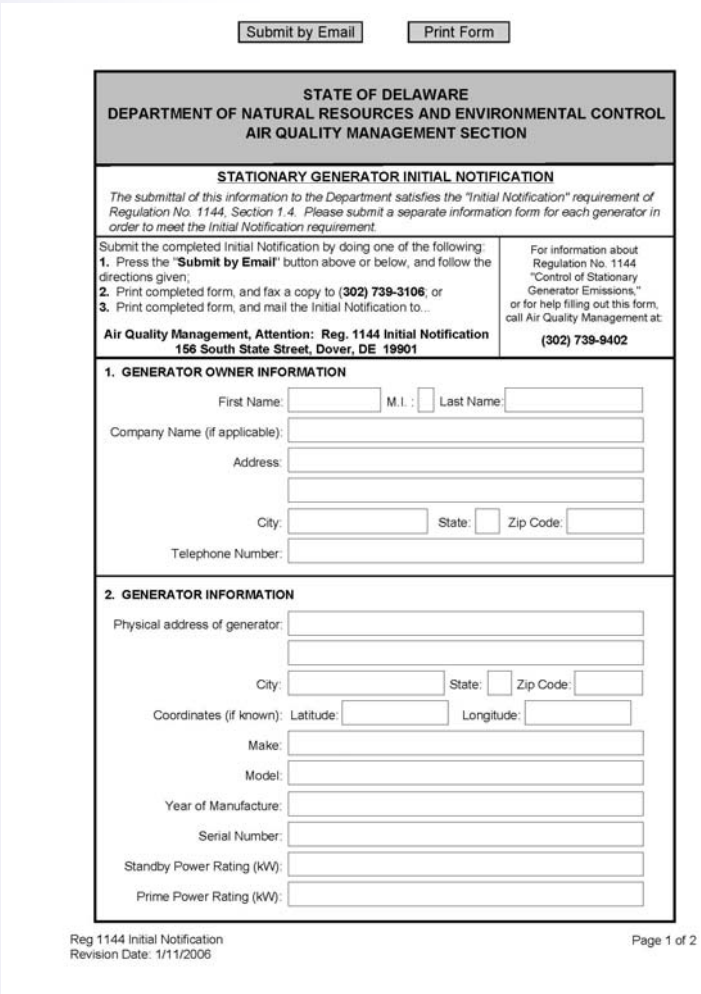
***If you are using this form electronically, press F1 at any time for help***

| General Information | |
|---|---|
| 1. | Facility Name: |
| 2. | Equipment ID: |
| 3. | Manufacturer: |
| 4. | Model: |
| 5. | Serial Number: |
| 6. | Rated Heat Input: MMBTU/hour |
| 7. | Maximum Power Output: **horsepower** |
| 8. | Date of Manufacture: |
| 9. | Installation Date: |
| 10. | Is the Equipment Being Applied For a Generator or an Engine? ☐ Generator ☐ Engine |
| *If the equipment is a Generator, complete the rest of Question 10. If not, proceed to Question 11.* | |
| 10.1. | Is the Generator Existing or New? ☐ Existing ☐ New |
| 10.2. | Will the Generator Be Classified as an Emergency Generator or a Distributed Generator? ☐ Emergency ☐ Distributed |
| 10.3. | Has an Initial Notification Pursuant to State of Delaware Regulation No. 1144 Been Submitted for this Generator? ☐ YES ☐ NO |
| **If NO, include a copy of the Initial Notification with this application.** | |
| 10.4. | Have the Emissions From the Generator Been Certified to Meet the Currently Applicable US EPA Non-Road Emission Standards? ☐ YES ☐ NO |
| **If YES, attach a copy of the Manufacturer's Certification. If NO, attach copies of any/all of the following: any maintenance or operating requirements/instructions provided by the generator manufacturer; the type, or a description, of any emission control equipment use; and/or emissions test data for the generator (such as a manufacturer's technical data sheet), any supporting documentation for any emission control equipment used, any supporting calculations, any quality control or assurance information, and any other information needed to demonstrate compliance with the requirements. Proceed to Question 11.** | |
| 11. | Primary Fuel: ☐ Natural Gas ☐ Diesel ☐ Propane ☐ Biodiesel ☐ Other (specify): |
| 11.1. | Maximum Annual Primary Fuel Consumption: **MMCF** |
| 11.2. | Heat Content of Primary Fuel: **BTU/CF** |
| 11.3. | Maximum Firing Rate: **MMCF/hr** |
| 11.4. | Percent Sulfur of Primary Fuel: % |
| 11.5. | Percent Ash of Primary Fuel: % |

Final Application – Version 2 created 2/6/2007

# Regulation No. 1144

## Initial Notification Form for Emergency Generators



Submit by Email  Print Form

**STATE OF DELAWARE**
**DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL**
**AIR QUALITY MANAGEMENT SECTION**

**STATIONARY GENERATOR INITIAL NOTIFICATION**

*The submittal of this information to the Department satisfies the "Initial Notification" requirement of Regulation No. 1144, Section 1.4. Please submit a separate information form for each generator in order to meet the Initial Notification requirement.*

Submit the completed Initial Notification by doing one of the following:
1. Press the "**Submit by Email**" button above or below, and follow the directions given;
2. Print completed form, and fax a copy to (**302) 739-3106**; or
3. Print completed form, and mail the Initial Notification to...

**Air Quality Management, Attention: Reg. 1144 Initial Notification**
**156 South State Street, Dover, DE 19901**

For information about Regulation No. 1144 "Control of Stationary Generator Emissions," or for help filling out this form, call Air Quality Management at:
**(302) 739-9402**

**1. GENERATOR OWNER INFORMATION**

First Name: M.I.: Last Name:
Company Name (if applicable):
Address:
City: State: Zip Code:
Telephone Number:

**2. GENERATOR INFORMATION**

Physical address of generator:
City: State: Zip Code:
Coordinates (if known): Latitude: Longitude:
Make:
Model:
Year of Manufacture:
Serial Number:
Standby Power Rating (kW):
Prime Power Rating (kW):

Reg 1144 Initial Notification
Revision Date: 1/11/2006

Page 1 of 2

All generators above 10 kW require this initial notification form.

There are no fees associated with the initial notification form.

# *Permitting Process*

- Application review meeting (strongly suggested)
- Company XYZ submits construction permit application
- Administrative completion
- Technical completion
- Legal ad (Public notice)
  - 15 days: Natural minor facility
  - 30 days: Synthetic minor facility
- Construction permit issued, signed, and mailed
- Construction to operation inspection
- Operating permit

# *When I will get my permit?*

- Construction permit:
  - Within 90 days (Natural minor facility)
  - Within 120 days (Synthetic minor facility)
- Operating Permit:
  - Issued immediately after the Construction to Operation Inspection

# *Permit Requirements for Emergency Generators*

- Emergency generator usage only in case of an emergency
- Do not use emergency generator for peak shaving
- Fuel certification: Diesel 0.05% sulfur content by weight
- No testing or maintenance before 5 pm on code orange or red for ozone
- Recordkeeping

# Full Compliance Evaluation of Emergency Generators

- Permit available at site
- Log of hours
- Log of fuel usage
- Fuel certification
- Hour meter
- Proper operating condition / Visible emissions
- Fuel sample / Chain of custody

**EMERGENCY GENERATOR INSPECTION**

**Company Name:** _____ **Inspection Date:** _____

**Address:** _____ **Process Equipment:** _____
(confirm model and kW of generator)

**Contact Name:** _____ **Permit Number:** _____ **Construction/Operation or Registration**

**Inspection Checklist**

| No. | Issues | Yes | No | Comments |
|---|---|---|---|---|
| **Recordkeeping** | | | | |
| 1 | Copy of the permit available at the site. | | | |
| 2 | Maximum hours of operation in a 12 month rolling period: _____ hours (< 500 hours).<br><br>Number of times it was run: _____ in a year<br><br>For Registered generators: Maximum hours/day ____ (not to exceed emissions of 10 lbs/day) | | | |
| 3 | Maximum gallons of fuel usage in a twelve (12) month rolling period: _____ gallons (shall not exceed _____ gallons per twelve (12) month rolling basis). | | | |
| 4 | Date, time and reason for each startup of the emergency generator (in a log book form). | | | |
| 5 | Type of Fuel used: _____<br>Fuel supplier certifications on site for each delivery:<br>• Fuel supplier name.<br>• Date of delivery.<br>• Amount of delivery.<br>• Oil sampling method.<br>• Sulfur content of the fuel (< 0.3 % by weight). | | | |
| **Operation** | | | | |
| 6 | Run meter on emergency generator (if there is one):<br>Total hours of operation: _____ hours | | | |
| 7 | Emergency generator shall only operate due to:<br>• Power supply from the local utility has failed.<br>• Periodic startup testing not on forecasted ozone action day* | | | |
| 8 | Proper operating condition. | | | |
| 9 | Fuel sample taken. | | | |
| **Emissions** | | | | |
| 10 | Emission point: Generator stack | | | |
| 11 | Emission no greater than 20% opacity in mo more than 3 minutes in 1 hour and no more than 15 minutes in any 24 hour period | | | |
| 12 | Method 9 performed. | | | |
| 13 | Detectable odors. | | | |
| **Mailing Report** | | | | |
| 14 | Confirm name and address where report should be mailed | | | |

** Have a list handy of the Ozone Action Days for the year*

*06/23/04-GJR*

# *Common Problems at Full Compliance Evaluations*

- Fuel Certification: no sulfur testing method
- Total hours of operation for each month and 12 month rolling period
- Total fuel usage for each month and 12 month rolling period
- Not registered with the State to receive an alert on a day with high ozone level

# *Fuel Certification*

- Sulfur content by weight:
  - Low sulfur diesel (LSD): 500 ppm (0.05%)
  - Ultra low sulfur diesel (ULSD): 15 ppm (0.0015%)
- Method used for sulfur testing:
  - ASTM D2622-03
  - ASTM D4294-03
  - ASTM D5453-03a
  - D6428-99
  - Any test method approved under 40 CFR Part 80, Subpart I, Section 80.585

# Fuel Certification from Vendor

SUNOCO, INC.

MARKETING SPECIFICATION
SPECIFICATIONS FOR HIGHWAY #2 DIESEL
MEETS OR EXCEEDS CURRENT ASTM: D-975-03

| TESTS | METHOD | SPECIFICATIONS MIN. | MAX. |
|---|---|---|---|
| Gravity, °API | D 287 | 30 | 39 |
| Distillation | D 86 | | |
| 90%, °F | | 540 | 640 |
| End Point, °F | | | 690 |
| Viscosity, cSt @ 104°F | D 445 | 1.9 | 3.4 |
| Flash, PMCC °F | D 93 | 125 | |
| Haze Rating @ 70°F | D 4176 | | 2 |
| Color | D 1500 | | 2.5 |
| Water & Sediment, % | D 1796 | | 0.05 |
| Copper Strip, 3 hrs@122°F | D 130 | | 1 |
| Ramsbottom Carbon on 10% Res., % | D 524 | | 0.35 |
| Ash, Wt. % | D 482 | | 0.01 |
| Sulfur, Wt. % | D 2622 or D 4294 | | 0.047 |
| Cetane Number or | D 613 | 40 | |
| Cetane Index | D 4737 | 40 | |
| Cetane Index | D 976 | 42 | |

**Method:**

D2622 or D4294

**Sulfur Weight%**
0.047

# Recordkeeping of Operating Hours

## Monthly And Yearly Operating Hours Records

### for Stationary Generators Subject to Regulation No. 1144

**1.** For each month listed, write down the generator's current **"Hour Meter Reading"** on the first day of each month.
**2.** Record the **"Total Operating Hours"** the generator ran during each month (due to any reason) by subtracting that month's **"Hour Meter Reading"** from the following month's **"Hour Meter Reading"**.
**[ Example: (5/06 "Hour Meter Reading") - (4/06 "Hour Meter Reading") = (4/06 "Total Operating Hours") ]**
**3.** To determine the **"Yearly Total"**, add the previous eleven (11) months' **"Total Operating Hours"** to the current month's **"Total Operating Hours"**.
**4.** For each month listed, record the total **"Testing or Maintenance Hours"** performed on the generator during that month.
**5.** To determine the **"T or M Yearly Total"**, add the previous eleven (11) months' **"Testing or Maintenance Hours"** to the current month's **"Testing or Maintenance Hours"**.
**6.** Write down a brief description of what testing or maintenance was performed, such as "oil change", "(part) replaced", or "weekly/monthly test run".
**7.** For more information about Regulation No. 1144, please contact Air Quality Management at 302-739-9402.

**Generator Owner's Name and Phone Number:** _____

**Generator Location:** _____

_____

_____

**Generator Classification (Emergency or Distributed):** _____

**Generator Size (kW):** _____

| Month | Hour Meter Reading | Total Operating Hours | Yearly Total | Testing or Maintenance Hours | T or M Yearly Total | Description of Testing or Maintenance Performed |
|---|---|---|---|---|---|---|
| 4/2006 | | | A Yearly Total cannot be detemined without 12 months of data. March 2007 will be the first month in which a Yearly Total can be determined. | | A Yearly Total cannot be detemined without 12 months of data. March 2007 will be the first month in which a Yearly Total can be determined. | |
| 5/2006 | | | | | | |
| 6/2006 | | | | | | |
| 7/2006 | | | | | | |
| 8/2006 | | | | | | |
| 9/2006 | | | | | | |
| 10/2006 | | | | | | |
| 11/2006 | | | | | | |
| 12/2006 | | | | | | |
| 1/2007 | | | | | | |
| 2/2007 | | | | | | |
| 3/2007 | | | | | | |
| 4/2007 | | | | | | |
| 5/2007 | | | | | | |

* All records must be kept for a minimum of 5 years, and only need to be submitted to Air Quality when requested.

Revision Date: 3/13/2006

# Recordkeeping of Fuel Usage

## Monthly And Yearly Fuel Usage Records
### for Stationary Generators Subject to Regulation No. 1144

**1.** For each month listed, write down the type of fuel used in the generator, and record the amount of fuel used in the generator during that month.
**2.** Please circle the correct units for the amounts of fuel being recorded:
**(GALLONS) (CUBIC FEET) (POUNDS)**

**3.** To determine the **"Yearly Total"**, add the previous eleven (11) months' **"Fuel Usage"** to the current month's **"Fuel Usage"**.
**4.** For more information about Regulation No. 1144, please contact Air Quality Management at 302-739-9402.

| Month | Fuel Type | Fuel Usage | Yearly Total |
|---|---|---|---|
| 4/2006 | | | A Yearly Total cannot be detemined without 12 months of data. March 2007 will be the first month in which a Yearly Total can be determined. |
| 5/2006 | | | |
| 6/2006 | | | |
| 7/2006 | | | |
| 8/2006 | | | |
| 9/2006 | | | |
| 10/2006 | | | |
| 11/2006 | | | |
| 12/2006 | | | |
| 1/2007 | | | |
| 2/2007 | | | |
| 3/2007 | | | |
| 4/2007 | | | |
| 5/2007 | | | |
| 6/2007 | | | |
| 7/2007 | | | |
| 8/2007 | | | |
| 9/2007 | | | |
| 10/2007 | | | |
| 11/2007 | | | |
| 12/2007 | | | |
| 1/2008 | | | |
| 2/2008 | | | |
| 3/2008 | | | |

**Generator Owner's Name and Phone Number:** _____

**Generator Location:** _____

**Generator Classification (Emergency or Distributed):** _____ **Generator Size (kW):** _____

* **All records must be kept for a minimum of 5 years, and only need to be submitted to Air Quality when requested.**

**Revision Date: 3/13/2006**

# *How can I avoid violations on a code orange or red for ozone?*

| Year | Code orange (days) | Code red (days) |
|---|---|---|
| 2006 | 15 | 2 |
| 2007 | 24 | 0 |
| 2008 | 21 | 4 |

**Averaged over an 8 hour period:**

**Between 75 – 95 ppb ozone (Code orange)**

**Greater than 95 ppb ozone (Code red)**

- Please register to receive a Ground Level Ozone Pollution Forecast at:

www.dnrec.state.de.us/DNREC2000/admin/maillists/maillists.htm

# *For more information about generators…*

Please, contact us at DNREC - Air Quality Management:


**Mark A. Prettyman**
**Phone: 302-739-9402**
**mark.prettyman@state.de.us**

**156 S. State Street**
**Dover, DE 19901**
**302-739-9402**

**OR**

**Lupe J. Reynolds**
**Phone: 302-323-4542**
**guadalupe.reynolds@state.de.us**

**715 Grantham Lane**
**New Castle, DE 29720**
**302-323-4542**